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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/520,648 | 09/21/2005 | Thomas Engel | GK-ZEI-3262/500343.20282 | 5194 |

26418 7590 09/17/2008

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| EXAMINER | |
|---|---|
| CHANG, SUNRAY | |
| **ART UNIT** | **PAPER NUMBER** |
| 2121 | |

| MAIL DATE | DELIVERY MODE |
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| 09/17/2008 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/520,648 | ENGEL ET AL. | |
| | Examiner | Art Unit | |
| | Sunray R. Chang | 2121 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *26-50* is/are pending in the application.

4a) Of the above claim(s) *1-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20050107*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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# *Examiner's Detailed Office Action*

1. This Office Action is responsive to communication, filed on January 7th, 2005.

Claims 1 – 25 have been cancelled, Claims 26 – 50 have been presented on January 7th, 2005

## *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted to disclose 37 C.F.R. 1.56 all pertinent information and material pertaining to the patentability of applicant's claimed invention, on January 7th, 2005 has been considered by the examiner.

## *Drawings*

3. The formal drawings submitted have been reviewed by the Office of Initial Patent Examination (OIPE) and/or the USPTO Office of Draftperson's Patent Drawings Review.

## *Claim Rejections - 35 USC § 112*

4. Claims 43 and 45 recite the limitations, "the side", "the structure side". There is insufficient antecedent basis for these limitations in the claim.

## *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claim(s) 26 – 39, 40 – 43, 46, 47 and 50** is/are rejected under 35 U.S.C. 103(a) as being unpatentable over David C. Ferranti et al. (U.S. P.G. Pub. No. 2001/0027917, and referred to as **Ferranti** hereinafter) and in view of Christopher A. Spence (U.S. Patent No. 7,120,285, and referred to as **Spence** hereinafter.

Regarding **claim(s) 26 – 36, 39, 47, 50 Ferranti** teaches,

- An arrangement for the production of photomasks, [repairing opaque defects, Abstract; removing material from a semiconductor lithography mask, [0002]; computer instruction, claim 12 and 20] comprising:

Based on specification paragraph 0002 – 0006,

defect control system includes AIMS, AFM systems;

measurement system includes AIMS, microscope, AFM, FIB, electron-beam systems (U.S. Patent 5,357,116 indicates a charged-particle beam such as a focused-ion beam (FIB) or electron beam, col. 1, lines 7 – 11);

repair system includes material removal/deposition, ablation systems.

All the individual systems, as listed above, are well known in the art, and will be treated as defect control system, measurement system and repair system hereinafter. (for example, U.S. Patent 5,981,110 to George et al. discloses defect repair system as laser ablation)

- at least one defect control system; [AIMS, AFM, [0040, 0044]; these systems measure transparency values through repaired region, which can be used to determine riverbed/depress situation for further operation, see 0037 – 0046, Table 3, which can be treated as defect control system] and
- at least one repair system or measurement; [FIB systems … necessary analytical tools for use in … lithography mask repair, failure analysis and effect characterization, [0003]]
- said at least one defect control system being connected to said at least one repair system or measurement by a continuous data connection or online connection. [decreases the size of riverbeds and provides increased substrate transparency at the repaired area, [0013]; [FIB systems … necessary analytical tools for use in … lithography mask repair, failure analysis and effect characterization, [0003]; AIMS, AFM, measure transparency values through repaired region, determine riverbed/depress situation, see [0037 – 0046], Table 3; [0028]]

The examiner further explains, since AIMS/AFM measures transparency values for the repaired area, the data is necessarily to be transmitted to the repair system for further operation.

**Spence** teaches AIMS system and Virtual Stepper System inserting desired numerical and sigma apertures into microscope's optical column [col. 9, lines 32 – 56], further teaches data

connections between processor and microscopes, [fig. 3 and 4] for the purpose of transformation of the image of the mask, [col. 9, lines 32 – 40] and for communication purpose.

It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of **Ferranti** to include "the data connection between defect control and repair/measurement system", for the purpose of communication.

Regarding **claim(s) 37, Ferranti** teaches,

- the defect control system and repair system are arranged in a common measurement chamber. [chamber 26, [0019]; electron microscope, [0021]]

Regarding **claim(s) 38** and **46 Ferranti** teaches,

- a vacuum is generated or a protective atmosphere is provided in the common chamber. [chamber is evacuated with turbomolecular and mechanical pumping system, [0019]

Regarding **claim(s) 40**, **Ferranti** teaches,

- a common platform with adjusting devices is provided for the defect control system and repair system. [X-Y stage within the lower chamber, [0019], 24, fig. 1]

Regarding **claim(s) 41**,

- the direction of the measurement axis and repair axis intersect at a common point and/or the working areas of the measurement system and repair system overlap. [X-Y stage within the lower chamber, [0019], 24, fig. 1]

Regarding **claim(s) 42**,

- the direction of the repair axis is inclined relative to the measurement axis of the AIMS system. [X-Y stage within the lower chamber, [0019], 24, fig. 1]

Regarding **claim(s) 43**,

- the measurement system is arranged on the side of the mask remote of the structure side and the repair system is arranged on the structure side. [fig. 1]

6. **Claim(s) 44 and 45** is/are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ferranti** in view of **Spence** and further in view of Gottfried Lange et al. (U.S. Patent No. 4,737,641, and referred to as **Lange** hereinafter).

**Ferranti** teaches a focused ion beam (FIB) as indicated above;

**Ferranti** does not teach the measurement system works in transmission mode;

In Spec [0029] "transmission mode" been defined to have a beam splitter for the beam.

**Lange** teaches a beam splitter, [fig. 3, col. 4, lines 27 – 52] for dividing a single beam into two beam components [col. 4, lines 27 – 30].

It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of **Ferranti** to include "a beam splitter" to make the measurement system works in transmission mode, for the purpose of dividing a single beam into two beam components [col. 4, lines 27 – 30].

7. **Claim(s) 48 and 49** is/are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ferranti** in view of **Spence** and further in view of Rama R. Goruganthu et al. (U.S. Patent No. 6,069,366, and referred to as **Goruganthu** hereinafter).

**Ferranti** teaches a repair system (FIB), a defect control system (AIMS) as listed above;

**Ferranti** does not teach simultaneously measuring and fixing;

**Spence** teaches AIMS system and Virtual Stepper System inserting desired numerical and sigma apertures into microscope's optical column [col. 9, lines 32 – 56], further teaches data connections between processor and microscopes, [fig. 3 and 4] for the purpose of transformation of the image of the mask, [col. 9, lines 32 – 40] and for communication purpose.

**Goruganthu** teaches simultaneously measuring and fixing [steps of silicon removal 404 and measuring induced current 406 are repeated until the signal strength of the induced signal corresponds to the signal for desired silicon thickness as depicted by reference number 408 [col. 8, lines 10 – 23], for the purpose of detection of endpoint for silicon removal [col. 8, line 11].

It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of **Ferranti** to include "simultaneously measuring and fixing", for the purpose of detection of endpoint for silicon removal [col. 8, line 11].

## *Correspondence Information*

8. Any inquires concerning this communication or earlier communications from the examiner should be directed to Sunray Chang, who may be reached Monday through Friday, between 6:00 a.m. and 3:00 p.m. EST. or via telephone at (571) 272-3682 or facsimile transmission (571) 273-3682 or email sunray.chang@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful in the regular office hour, the Examiner's Supervisor, Albert Decady, may be reached at (571) 272-3819.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Finally, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Moreover, status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) toll-free @ 1-866-217-9197.

***Sunray Chang***
Art Unit 2121
U.S. Patent & Trademark Office

/Albert DeCady/
Supervisory Patent Examiner, Art Unit 2121

September 17, 2008

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